CLAIMS

What is claimed is:

1. A power management system, comprising:

a plurality of power switch control circuits, each of said power switch control circuits configured to selectively disengage one or more electrical loads;

a plurality of wireless receivers, each connected to one of said power switch control circuits;

at least one wireless transmitter; and

a central station, said central station causing messages to be transmitted by said at least one wireless transmitter to said power switch control circuits, said power switch control circuits responding thereto by disengaging electrical loads according to locally configurable settings.

2. The power management system of claim 1, wherein said power switch control circuits are located at remote, geographically disparate locations.

3. The power management system of claim 1, wherein one or more of said power switch control circuits comprises a set of controllable switches interposed between a power supply line and said plurality of electrical loads.

4. The power management system of claim 3, wherein said set of controllable switches of one or more of said power switch control circuits is

connected in series with a plurality of circuit breakers, one circuit breaker provided for each of said electrical loads.

5. The power management system of claim 3, wherein each of said power switch control circuits comprises a processor for receiving said messages via its respective wireless receiver, and a memory for storing program instructions for said processor according to which the processor controls said controllable switches.

6. The power management system of claim 3, wherein said controllable switches are disengaged according to a locally configurable priority.

7. The power management system of claim 6, wherein said locally configurable priority is determined at least in part by manual switch settings.

8. The power management system of claim 6, wherein said locally configurable priority is determined by programmable parameters stored at each of the power switch control circuits via a local user interface.

9. The power management system of claim 3, wherein one or more of said controllable switches comprises a bimetal member, said bimetal member being deformed by a control signal which causes heating of the bimetal member and thereby results in changing the on/off state of the controllable switch.

10. The power management system of claim 3, wherein one or more of said controllable switches at one or more of the power switch control circuits comprises:

a deformable member having a first end and a second end, said deformable member anchored at said first end and residing in contact with an electrical conductor at said second end;

a heating element in proximity with the deformable member; and

a switch control signal connected to said heating element, said switch control signal emanating from the power switch control circuit;

wherein an incoming wire drawing power from said power supply line is physically connected to the deformable member at said second end near the electrical conductor, said incoming power wire being electrically connected to said electrical conductor when the deformable member resides in contact with the electrical conductor.

11. The power management system of claim 10, wherein assertion of said switch control signal forces a current through said heating element causing said heating element to heat, thereby bending said deformable member so as to break contact between the second end of the deformable member and the electrical conductor, and wherein non-assertion of said switch control signal causes said heating element to remain unheated thereby allowing said deformable member to remain unbent and in contact with the electrical conductor.

12. The power management system of claim 10, wherein said heating element comprises a resistive coil.

13. The power management system of claim 10, wherein said switch control signal is activated in response to a message received from said central station.

14. The power management system of claim 10, wherein said incoming power wire is welded to said second end of said deformable member.

15. The power management system of claim 10, wherein said deformable member comprises a bimetal member.

16. The power management system of claim 15, wherein said second end of said bimetal member has a top side comprised of a first metallic substance and a bottom side comprised of a second metallic substance, wherein said incoming power wire is welded to the top side of said second end of said bimetal member, and wherein the bottom side of said second end of said bimetal member resides in contact with the electrical conductor when the switch control signal is not asserted.

17. The power management system of claim 1, wherein said central station causes an early warning message to be transmitted by said wireless transmitter, prior to said messages causing said power switch control circuits to selectively disengage their electrical loads.

18. The power management system of claim 17, wherein one or more of said power switch control circuits comprises a display indicating that said early warning message has been received.

19. The power management system of claim 1, wherein one or more of said power switch control circuits comprises a display indicating whether any of its respective electrical loads have been disengaged.

20. The power management system of claim 1, wherein at least one of the messages transmitted by said central station causes said power switch control circuits to enter a designated alert stage level from among a plurality of alert stage levels.

21. The power management system of claim 20, wherein said alert stage levels are ordered from a lowest alert stage level to a highest alert stage level, and wherein said power switch control circuits can be configured, via said locally configurable settings, to disengage more electrical loads at higher alert stage levels than at lower alert stage levels.

22. The power management system of claim 1, wherein said central station transmits a delay period command in connection with at least one of said messages, and wherein said power switch control circuits wait for a delay period indicated by said delay period command prior to disengaging said electrical loads.

23. The power management system of claim 1, wherein said power switch control circuits are interposed between power lines from a power utility and said electrical loads, and wherein said power switch control circuits draw operational power from said power lines through a decoupling element.

24. The power management system of claim 23, wherein said decoupling element comprises a capacitor.

25. The power management system of claim 23, wherein said decoupling element comprises a transformer.

26. The power management system of claim 1, wherein one or more of said power switch control circuits comprises a local wireless transmitter, and wherein said central station comprises a wireless receiver for receiving transmissions from said one or more of said power switch control circuits, to effectuate bi-directional wireless communication between said central station and said one or more of said power switch control circuits.

27. The power management system of claim 1, wherein one or more of said power switch control circuits comprises a memory for storing historical data regarding the power switch control circuit's response to said messages from said central station.

28. The power management system of claim 1, wherein said messages can be targeted to specific groups of said power switch control circuits.

29. The power management system of claim 28, wherein said messages are targeted to specific groups of said power switch control circuits by use of distinct group addresses, frequencies, codes, encoding schemes, or any combination thereof.

30. A method for power management, comprising the steps of:

transmitting, from a central station via a wireless transmitter, messages directed to a plurality of power switch control circuits, each of said power switch control circuits interposed between a power supply line and a plurality of local electrical loads;

receiving said messages at said power switch control circuits; and

at one or more of said power switch control circuits, in response to said messages, disengaging the local electrical loads according to locally configurable settings.

31. The method of claim 30, wherein said power switch control circuits are located at remote, geographically disparate locations.

32. The method of claim 30, wherein each of said power switch control circuits comprises a set of controllable switches interposed between the power supply line and the local electrical loads.

33. The method of claim 32, wherein said set of controllable switches for at least one of said power switch control circuits is connected in series with a plurality of circuit breakers, one circuit breaker provided for each of the electrical loads.

34. The method of claim 32, wherein each of said power switch control circuits comprises a wireless receiver for receiving said messages from said central station, a processor for interpreting and responding to said messages, and a memory for storing program instructions for said processor according to which the processor controls said controllable switches.

35. The method of claim 32, wherein said step of disengaging the local electrical loads according to locally configurable settings comprises the step of disengaging said controllable switches according to a locally configurable priority.

36. The method of claim 35, wherein said locally configurable priority is determined at least in part by manual switch settings.

37. The method of claim 35, wherein said locally configurable priority is determined by programmable parameters stored at each of said power switch control circuits via a local user interface.

38. The method of claim 32, wherein one or more of said controllable switches comprises a bimetal member, said bimetal member being deformed by a control signal which causes heating of the bimetal member and thereby results in changing the on/off state of the controllable switch.

39. The method of claim 32, wherein one or more of said controllable switches at one or more of said power switch control circuits comprises:

a deformable member having a first end and a second end, said deformable member anchored at said first end and residing in contact with an electrical conductor at said second end;

a heating element in proximity with the deformable member; and

a switch control signal connected to said heating element, said switch control signal emanating from the power switch control circuit;

wherein said power supply line is electrically connected, through an incoming power wire, to the deformable member at said second end near the electrical conductor, said incoming power wire being electrically connected to said electrical conductor when the deformable member resides in contact with the electrical conductor.

40. The method of claim 39, wherein assertion of said switch control signal forces a current through said heating element causing said heating element to heat, thereby bending said deformable member so as to break contact between the second end of the deformable member and the electrical conductor, and wherein non-assertion of said switch control signal causes said heating element to

remain unheated thereby allowing said deformable member to remain unbent and in contact with the electrical conductor.

41. The method of claim 39, wherein said heating element comprises a resistive coil.

42. The method of claim 39, further comprising the step of activating said switch control signal in response to one of said messages from said central station.

43. The method of claim 39, wherein said incoming power wire is welded to said second end of said deformable member.

44. The method of claim 39, wherein said deformable member comprises a bimetal member.

45. The method of claim 44, wherein said second end of said bimetal member has a top side comprised of a first metallic substance and a bottom side comprised of a second metallic substance, wherein said incoming power wire is welded to the top side of said second end of said bimetal member, and wherein the bottom side of said second end of said bimetal member resides in contact with the electrical conductor when the switch control signal is not asserted.

46. The method of claim 30, further comprising the step of transmitting from said central station, via said at least one wireless transmitter, an early warning

message prior to said messages causing said power switch control circuits to selectively disengage their electrical loads.

47. The method of claim 46, further comprising the step of displaying at one or more of said power switch control circuits an indication that said early warning message has been received.

48. The method of claim 30, further comprising the step of displaying at one or more of said power switch control circuits an indication of which electrical loads, if any, have been disengaged.

49. The method of claim 30, further comprising the step of placing said power switch control circuits in a designated alert stage level, from among a plurality of alert stage levels, in response to at least one of the messages transmitted by said central station.

50. The method of claim 30, wherein said alert stage levels are ordered from a lowest alert stage level to a highest alert stage level, and wherein said method further comprises the step of configuring said power switch control circuits, via said locally configurable settings, to disengage more electrical loads at higher alert stage levels than at lower alert stage levels.

51. The method of claim 30, further comprising the steps of

transmitting, from said central station via said at least one wireless transmitter, a delay period command in connection with at least one of said messages; and

waiting, at said power switch control circuits, a delay period indicated by said delay period command prior to disengaging said electrical loads.

52. The method of claim 30, wherein said power switch control circuits are interposed between power lines from a power utility and said electrical loads, and wherein said power switch control circuits draw operational power from said power lines through a decoupling element.

53. The method of claim 52, wherein said decoupling element comprises a capacitor.

54. The method claim 52, wherein said decoupling element comprises a transformer.

55. The method of claim 30, further comprising the step of conducting bi-directional communication between said central station and said one or more of said power switch control circuits, said central station comprising a wireless receiver, and one or more of said power switch control circuits comprising a local wireless transmitter.

56. The method of claim 30, further comprising the step of storing, at one or more power switch control circuits having a memory for data storage, historical data regarding the power switch control circuit's response to said messages from said central station.

57. The method of claim 30, further comprising the step of targeting said messages to specific groups of said power switch control circuits.

58. The method of claim 57, wherein said messages are targeted to specific groups of said power switch control circuits by use of distinct group addresses, frequencies, codes, encoding schemes, or any combination thereof.

59. A system for reducing power consumption in a power distribution system, comprising:

a plurality of wireless energy control units, each of said wireless energy control units comprising a wireless receiver and controlling power flow from incoming power wires to one or more local electrical loads;

at least one wireless transmitter; and

a central station, said central station transmitting messages via said at least one wireless transmitter to said wireless energy control units, said messages instructing said wireless energy control units to switch among a non-alert stage level and one or more alert stage levels, said wireless energy control units responding thereto by selectively modifying the power flow to their respective local electrical loads according to the alert stage level instructed by the central station.

60. The system of claim 59, wherein said wireless energy control units are located at remote, geographically disparate locations.

61. The system of claim 59, wherein each of said energy control units comprises a plurality of controllable switches interposed between the incoming power supply wires and the plurality of local electrical loads, said controllable switches capable of causing said incoming power supply wires to be individually connected to or disconnected from the plurality of local electrical loads.

62. The system of claim 61, wherein the controllable switches of one or more of said wireless energy control units are connected in series with a plurality of circuit breakers, one circuit breaker provided for each of the local electrical loads.

63. The system of claim 61, wherein each of said wireless energy control units comprises a processor for interpreting said messages and responding thereto, and a memory for storing program instructions for said processor according to which the processor controls said controllable switches.

64. The system of claim 61, wherein said controllable switches are disengaged according to a locally configurable priority.

65. The system of claim 64, wherein said locally configurable priority is determined at least in part by manual switch settings.

66. The system of claim 64, wherein said locally configurable priority is determined by programmable parameters stored at each of the wireless energy control units via a local user interface.

67. The system of claim 61, wherein one or more of said controllable switches comprises a bimetal member, said bimetal member being deformed by a control signal which causes heating of the bimetal member and thereby results in changing the on/off state of the controllable switch.

68. The system of claim 67, wherein heating of the bimetal member is caused by heating a resistive coil.

69. The system of claim 59, wherein said central station transmits via said at least one wireless transmitter an early warning message prior to said messages instructing said wireless energy control units to switch among said non-alert stage level and said one or more alert stage levels.

70. The system of claim 59, wherein said alert stage levels are ordered from a lowest alert stage level to a highest alert stage level, and wherein said wireless energy control units can be configured, via said locally configurable settings, to disengage more electrical loads at higher alert stage levels than at lower alert stage levels.

71. The system of claim 59, wherein decisions to switch between said non-alert stage level and said one or more alert stage levels are made by comparing total customer power demand to one or more power usage threshold levels.

72. The system of claim 59, wherein said central station transmits a delay period command in connection with at least one of said messages, and wherein said wireless energy control units wait for a delay period indicated by said delay period command prior to modifying the power flow to their electrical loads.

73. The system of claim 59, wherein one or more of said wireless energy control units comprises a local wireless transmitter, and wherein said central station comprises a wireless receiver for receiving transmissions from said one or more of said wireless energy control units, to effectuate bi-directional wireless communication between said central station and said one or more of said wireless energy control units.

74. The system of claim 59, wherein said central stage can target said messages to specific groups of said wireless energy control units.

75. The system of claim 59, wherein said messages are targeted to specific groups of said wireless energy control units by use of distinct group addresses, frequencies, codes, encoding schemes, or any combination thereof.

76. A method for reducing power demand within a power distribution system, said method comprising the steps of:

transmitting, from a central station via a wireless transmitter, messages directed to a plurality of wireless energy control units, each of said wireless energy control units controlling power flow from incoming power supply wires to one or more local electrical loads;

receiving said messages at said wireless energy control units, said messages instructing said wireless energy control units to switch among different alert stage levels; and

at one or more of said power switch control circuits, in response to said messages, selectively modifying the power flow to the respective local electrical loads based upon the alert stage level instructed by the central station.

77. The method of claim 76, wherein said wireless energy control units are located at remote, geographically disparate locations.

78. The method of claim 76, wherein each of said wireless energy control units comprises a plurality of controllable switches interposed between the incoming power supply wires and the plurality of local electrical loads, said controllable switches capable of causing said incoming power supply wires to be individually connected to or disconnected from the plurality of local electrical loads.

79. The method of claim 78, wherein the controllable switches of one or more of said wireless energy control units are connected in series with a plurality of circuit breakers, one circuit breaker provided for each of the local electrical loads.

80. The method of claim 78, wherein each of said wireless energy control units comprises a processor for interpreting said messages and responding thereto, and a memory for storing program instructions for said processor according to which the processor controls said controllable switches.

81. The method of claim 78, wherein said step of selectively modifying the power flow to the respective local electrical loads based upon the alert stage level instructed by the central station comprises the step of disengaging said controllable switches according to a locally configurable priority.

82. The method of claim 81, wherein said locally configurable priority is determined at least in part by manual switch settings.

83. The method of claim 81, wherein said locally configurable priority is determined by programmable parameters stored at each of the wireless energy control units via a local user interface.

84. The method of claim 78, wherein one or more of said controllable switches comprises a bimetal member, and wherein said method further comprises the step of deforming said bimetal member by a control signal which causes heating

of the bimetal member and thereby results in changing the on/off state of the controllable switch.

85. The method of claim 84, wherein heating of the bimetal member is caused by heating a resistive coil.

86. The method of claim 76, further comprising the step of transmitting from said central station transmits via said at least one wireless transmitter an early warning message prior to said messages instructing said wireless energy control units to switch among said non-alert stage level and said one or more alert stage levels.

87. The method of claim 76, wherein said alert stage levels are ordered from a lowest alert stage level to a highest alert stage level, and wherein said wireless energy control units can be configured, via said locally configurable settings, to disengage more electrical loads at higher alert stage levels than at lower alert stage levels.

88. The method of claim 76, further comprising the step of comparing total customer power demand to one or more power usage threshold levels to arrive at decisions to switch between said non-alert stage level and said one or more alert stage levels.

89. The method of claim 76, further comprising the steps of:

transmitting from said central station to said wireless energy control units, via said at least one wireless transmitter, a delay period command in connection with at least one of said messages; and

at said wireless energy control units, waiting for a delay period indicated by said delay period command prior to modifying the power flow to the electrical loads.

90. The method of claim 76, further comprising the step of conducting bi-directional communication between said central station and one or more of said wireless energy control units, said central station comprising a wireless receiver, and one or more of said wireless energy control units comprising a local wireless transmitter.

91. The method of claim 76, further comprising the step of targeting said messages to specific groups of said wireless energy control units.

92. The method of claim 91, wherein said messages are targeted to specific groups of said wireless energy control units by use of distinct group addresses, frequencies, codes, encoding schemes, or any combination thereof.